

Vol. 14, No. 4

TAMPA, FLORIDA, APRIL, 1933

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The growth shown AT RIGHT ABOVE has excessive vegetative tendencies. The leaves are



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Typical flush of growth from a tree which received an unbalanced fertilizer containing insufficient potash.

far apart and growth continues rather than the energy being used for bloom and fruit set. The fruiting tendency is sacrificed. The flush of growth is poorly distributed mostly at the top of the tree. When fruit is finally set it is usually coarse, rough and ammoniated. This is the way low-quality crops start.

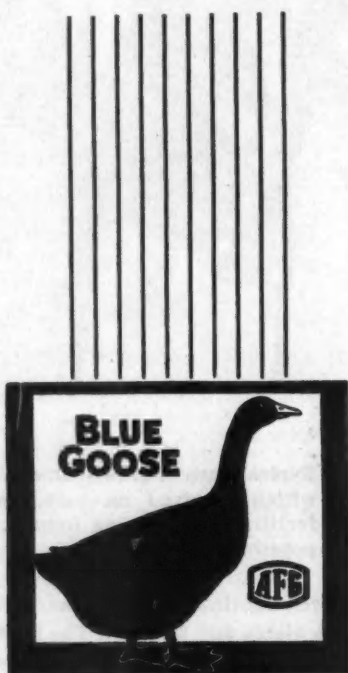
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American Fruit Growers Inc.

Florida, Division

Orlando, Florida



Vol. 14

TAMPA, FLORIDA, APRIL, 1933

No. 3

Research In Relation To The Citrus Industry

By C. T. MELVIN, at Meeting of State Horticultural Society

Sometime ago a large grower asked me to help him solve a problem which was causing him a lot of worry. Samples of his soil were taken and analyzed for calcium, iron, aluminum, humus, sulphates, etc., etc. A complete history of his fertilizing and cultural program was compiled as accurately as possible for several years, and note made of yields, quality and quantity of crop. A check was made of root stock, varieties and age of trees, class and type of soil, air and water drainage and the inevitable pH value.

When every theory and practice known to me was measured by his condition, I told him frankly that I thought I could help him but I did not know definitely, and that several things would have to be tried in order to find the solution. Now, this grower was very much provoked and said that another so-called expert had told him the same thing the day before. He wound up by making this significant remark. "I cannot afford to try this and that or wait until next year and perhaps lose my crop. I must know now." Here was a fine subject for the theorist to practice upon, except for the fact that this grower wanted to know and not to guess.

There never has been and never will be any royal road to knowledge and few basic laws are discovered in a purely accidental way. Most ad-

vancement in knowledge of all kinds have come slowly and only after laborious and discouraging drudgery. Hours, days and years of patient toil very often have resulted in complete failure.

How are we to find out about new cultural practices or unusual plant foods or pests and their effects upon crops? Right now, calcium is much talked about and a great many people will get into trouble if they follow some of the advice given them. Yet Calcium is really one of the primary plant foods and perhaps has a more vital part in the life cycle of citrus trees than we now know. Manganese is being used more and more, but what about magnesium and a number of other little known elements, all of them more or less necessary to fruit production? Maturity is of vast importance to every grower, but we have only hazy ideas how to profitably and economically hasten it.

Gummosis, ammoniation, defoliation, decline, splitting, stem-end drying, creasing, crop-skipping, irrigation, pruning, budding, root stocks, etc., etc. These and many more subjects present themselves to the grower every day and leave him much bewildered and discouraged.

Only a few people have any accurate idea of what is involved when an experiment is undertaken, or the vast amount of tedious work necessary. Little do they know of the long hours

spent with microscope and test tube in the hope of finding some indication of the key to the tightly locked secrets of nature. Then when some indicator is noticed it is absolutely necessary for the same procedure to be repeated time and time again to prove the theory to be a workable fact, or otherwise.

Back of all this necessary, laborious detail there must be trained eyes, minds and hands, and hearts tuned to the song of discovery—the urge to penetrate the barrier of mystery which surrounds the unknown, and infinite patience to try and try again.

I am sure that all this is very commonplace knowledge to you, but nevertheless, I am equally sure that you too want to "know right now," and are impatient when told you must wait until more is found out.

The citrus industry is of vast and increasing importance to the welfare of Florida. If we had a monopoly of citrus fruits or if other fruits and vegetables did not compete with it, then we might muddle along and more or less let nature take its course. The facts in the case, however, are that competition is very keen and that the buying power of the public is very low.

The grower is more than ever faced with the problem of how to produce strictly high grade fruit, protect it from insects and disease, keep his

(Continued on page 20.)

The Bulge Pack and Poor Containers As They Affect The Marketing of Florida Produce

By M. R. ENSIGN

AT MEETING OF FLORIDA HORTICULTURAL SOCIETY

The keynote in the administration of today's business, both public and private, is reduction—a tightening or pulling up of the waste line. It is well, therefore, that those interested in the horticultural industry of Florida should examine with some care the leaks and losses that can be profitably exercised. The income from the sale of horticultural produce from Florida amounts to about \$100,000,000 annually. If a saving equal to 10 or 15 percent of this amount could be added to the State's income, many social needs could be supplied.

The thesis of the present discussion, therefore, is this: An annual saving of 10 to 15 millions of dollars can be effected (1) by the elimination of the bulge pack and (2) by the adoption of scientifically constructed containers.

In order to logically develop this premise, it is necessary to review briefly some historical facts relative to the evolution of the produce business in Florida and in competing areas.

Historical

Florida produce faced practically no competition 30 years ago. Citrus and vegetable crops were available on northern markets in such limited quantities that everything sold at profitable prices. Consequently, there was little or no need for grading and anything approaching standard methods of packing was entirely unknown. Old boxes, barrels and bags of nondescript nature were used with few or no complaints or damage claims. From that time until now some improvements have been made in the design of containers but there has also developed simultaneously, a great multiplicity of types so that Florida produce goes out of the state in forty or fifty different kinds of containers. Unhappily, the majority of these are entirely unsuited for the use to which they are put, yet tradition continues them in use. Furthermore, the cost of containers could easily be cut 10 percent if two or three types were

adopted as the standard containers for all the produce from Florida. A few well chosen standard containers would also greatly simplify the marketing problem and strengthen the Florida markets enormously.

As intra- and inter-state competition has developed, much more attention has been given to grading, to the establishment of suitable brands and to the attractiveness of the packages. These changes have been particularly evident in the producing areas that have recently entered the field. Produce from these new areas required an entree, as it were, on to markets that had become highly competitive and the growers fully recognized the compelling arguments possessed by high quality, strict grades, attractive packages, and uniformity. Florida growers with an established market have not fully realized nor appreciated the extent and importance of these factors so that today they find themselves being dispossessed—having forfeited their birthright through delinquency and indifference.

Concurrent with the changes described above, another important but undesirable practise in the marketing of perishables has gained great momentum during the last decade. Containers have been purposely over filled, creating what is now commonly known as the "bulge pack." This practise began about 1922 with certain vegetable growers as a direct bid for the buyer's attention, altho Florida citrus had been given a slight bulge for some years in an effort to prevent a slack pack at the market terminals, due to a drying out of the fruit in transit. The buyers were not slow to recognize the advantages of the bulge pack so that they now demand a larger and larger bulge. Losses totalling millions of dollars annually are directly and indirectly attributable to the bulge pack.

Results of Investigations

The writer had the privilege of visiting the market terminals at New York and Philadelphia during February, 1932, and of studying the condition of produce on arrival and the methods of handling. It seems desir-

able to present here a brief word picture of the physical set up and the mechanics of handling the hundreds of cars that go each day into the New York terminal.

This terminal consists of an enclosed pier of 11 acres in area, provided with a heating plant to prevent freezing of the produce. Both cars and ships are docked and unloaded by stevedores using hand trucks. The cars are tugged over from the Jersey shore in groups of twenty, that is, there are two floats of 10 cars each lashed to the sides of the tugs. In this way the terminal railroad is responsible for unloading the cars, whereas in most railroad terminals, delivery is made directly from the car to the consignee who unloads it upon his own truck. This is an important distinction, as will be noted later. The stevedores recock the broken containers and repack them as can be expected. Commodities of a similar nature are grouped together and piled up on the pier for display, awaiting delivery to the receivers or for inspection by the buyers.

Why the Bulge Pack Should be Eliminated

1. The bulge pack compels the growers to give away a certain percentage of produce or make it appear as if they were.
2. The bulge pack is largely responsible for breakage of containers.
3. The compression incident to the bulge pack causes laceration, bruising, and spoilage of produce.
4. The wilful breakage of containers is encouraged by the use of the bulge pack.

Each of the above factors are considered in the order given.

From 10 to 20 packages per car of fruits and vegetables were weighed at the New York terminal. Lettuce, cabbage, tomatoes, beets, carrots and citrus were included, and usually more than one car of each commodity was represented. These weighings showed an excessive weight per package ranging from 10 to 60 percent, where the billing weights of these commodities served as a basis of com-

(Continued on page 24)

Effect of Lime (Calcium Hydroxide) on the Composition of Conner, Valencia and Satsuma Oranges

RALPH L. MILLER, Associate Entomologist, and IONE POPE BASSETT, Senior Scientific Aid, Bureau of Entomology, U. S. D. A., W. L. THOMPSON, Assistant Entomologist, Florida Experiment Station, and L. L. ENGLISH, Associate Entomologist Alabama Experiment Station

Lime is the material most commonly used in diluting both spray and dust insecticides. It is used in sulfur dusts and occasionally in lime-sulfur spray mixtures. It is the material most commonly used in making nicotine dusts, and considerable quantities are applied to citrus trees in this way. Many growers have been of the opinion that the lime used thus in citrus spray work has affected the composition of citrus fruit. The idea has even been commonly spread that generous applications of lime to the tree would hasten citrus fruit maturity. This idea is largely the result of a report by Gray Singleton, (1) in which he maintained that the use of hydrated lime in lime-sulfur solution sprays would cause early maturity of oranges and improve otherwise the color, texture, and edibility. No details of the analyses of calcium on trees or fruit analyses were given in the account.

Yothers and Mason found that lime was not toxic to rust mites.

Present Investigations

Since considerable interest had been developed in the effect of lime on orange trees, work was begun by R. L. Miller and I. P. Bassett at Orlando, Fla., to determine the effects, on orange-fruit composition, of concentrations of lime such as are used in insecticides. While this work was being summarized it was found that W. L. Thompson, at Lake Alfred, Fla., and L. L. English, at Spring Hill, Ala., had conducted work along exactly the same line with similar results. After correspondence between these four workers it was agreed that the subject could be best summarized and presented by putting into one paper an account of the results secured at the three locations. This

paper, therefore, presents the information gained at these three laboratories concerning the effect of lime on oranges.

Experiments With Conner Oranges (Orlando, Fla.)

In the work at Orlando, Fla., Conner orange trees 20 years old, growing on sandy, slightly acid soil were used. Two entire trees and two half-trees were sprayed, while two trees along with the unsprayed halves were used as checks. One application of lime was made to the soil of two trees on which no lime had been sprayed.

Four times during the experiment a composite sample of leaves was collected from all of the sprayed trees and a determination, in duplicate, was made of the calcium present. The leaves were treated with acetic acid and the calcium was then precipitated as calcium oxalate, burned to calcium oxide, and weighed.

The results of the calcium-residue determinations are shown in Table 1.

No calcium was present on the two trees that had 5 pounds of hydrated lime applied to the soil of each. Analyses of leaves from trees that were sprayed in June with hydrated lime at the rate of $2\frac{1}{2}$ pounds to 50 gallons of water showed that lime was present for more than four months during the rainy season. Immediately after spraying 22 mg of calcium oxide was found on 10 mg of green leaves, and three months after spraying 1.6 mg was found.

At the same time that the calcium determinations were made the respiration and catalase activity of the sprayed and unsprayed leaves were measured.

In the present work the rate of respiration was measured by determining the quantity of carbon dioxide liberated in a closed jar at a constant temperature, 25° c. (77° F.). The gas, carbon dioxide, was absorbed

in sodium hydroxide solution (tenth normal) and titrated against hydrochloric acid (tenth normal), the double indicator method being used.

When a test was to be made, twigs having from three to five leaves were cut under water and the cut ends were put in vials of water. During the two-day run the whole assembly was put in a jar with the sodium hydroxide in the bottom. The sodium hydroxide was titrated once daily. The entire experiment was run in a dark room and the twigs were kept at a temperature that varied less than one-half degree during the time of the experiment. After each run was completed the area of leaves used was determined by a planimeter and the weight of carbon dioxide liberated per square inch per 24 hours was used in comparison. In all cases the determinations were made in triplicate and the mean of the three was used.

The quantity of oxygen liberated from hydrogen peroxide by the catalase of the leaves was used as an index of the catalase activity. In making this determination 5 one-square-centimeter discs were cut from leaves washed in tap and distilled water and ground to a smooth paste with an equal quantity of calcium carbonate (CaCO_3) and a few drops of water. This was washed into a flask with 15 to 20 cc of distilled water and allowed to stand at 25° C. (77° F.) for one hour. Then it was connected to the apparatus where 20 cc of neutralized hydrogen peroxide (H_2O_2) was introduced and the quantity of oxygen evolved in five minutes was measured at one-half minute intervals. All of the determinations were made in a water bath at 25° C.

Even though the calcium was present on the leaves for over four

(Continued on page 22)

(1) 1931. Singleton, Gray. Proceedings of the Fla. State Horticultural Society, pp. 7-10. Importance of calcium on citrus culture.

Effect of Lead Arsenate Insecticides on Orange Trees In Florida

By R. L. MILLER, Assistant Entomologist, IONE P. BASSETT, Senior Scientific Aid, and W. W. YOTHERS, Entomologist, Division of Fruit and Shade Trees, Bureau of Entomology, in Bulletin No. 305, U. S. Dept of Agriculture

(Continued from last month)

Kind of Citrus Trees Used

The work reported in this bulletin, except where otherwise stated was carried on with orange trees. The principles involved in the effect of arsenic on grapefruit, tangerines, and other citrus fruits are probably the same as those involved in the effect on oranges, but the quantities of arsenic required to produce these effects may differ.

Effect of Lead Arsenate on Citrus Trees When Applied to the Soil

There has been much theorizing as to the effect of the drip of arsenical insecticides on the soil beneath citrus trees. The writers were unable to find any published information on this point, although unpublished notes of work done in 1926 by W. W. Yothers, F. A. Wolf, and O. C. Mc-

ed and having the average amount of humus.

The soil was sprayed at intervals of from one to two weeks with a hand operated pressure apparatus fitted with a rod and nozzle. Sixty applications of one-half pound of lead arsenate (30 pounds in all) in 7½ gallons of water were made beneath the grapefruit tree, and 14 applications (7 pounds in all) beneath the orange tree.

Method of Analysis

To obtain the arsenic from the soil for analysis, the distillation method was used. Fifty grams of soil was found to be the most satisfactory quantity for the test. After the solution had been obtained from the distillation, the quantity of arsenic in the solution was determined by the modified Gutzeit method. The pH value of each sample was determined

had arsenic present (as arsenic trioxide, As₂O₃) in the proportion of 2,000 parts per 1,000,000. During the 1½ year period over which this material had been applied there had been 115.15 inches of rainfall, and arsenic was found down as deep as 14 inches in the proportion of 3 parts of arsenic trioxide per 1,000,000 of soil. This makes it certain that the arsenic was well diffused among the roots, for almost all the roots of these citrus trees are found in the first foot of soil.

The orange tree under which 7 pounds of lead arsenic had been applied had proportional quantities, 700 parts per 1,000,000, in the upper 2 inches of the soil about its roots.

Effect On Foliage and Fruit

In the case of both the grapefruit and orange trees, the trees were absolutely normal, and only a trace of arsenic was found in the leaves. The flushes of growth appeared regularly, and the foliage was of normal size and color. The fruit was not affected, for by analysis the acid and solids were found to be but little different from those of the check trees. The color and size of the fruit were similar to those of the untreated trees near by.

Effect On Undergrowth

There were no differences in the growth of vegetation under the sprayed and unsprayed trees. With a few exceptions, there were the same plants, in the same state of

Table 4.—Effect of lead arsenate in spray on navel oranges as determined by Ikuro Takahashi in Japan in 1928

Treatment of plots	Average weight of fruit	Principal components of juice						
		Fruit	Pulp	Percent- age of juice to pulp	Specific gravity of juice	Citric acid	Reduc- ing sugar	Total sugar to acid
Lead orthoarsenate, 2 pounds; lime sulphur (0.8 per cent), 50 gallons	222.1 5	76.78	64.55	1.050	0.4533	6.8646	8.0123	17.57
Check	216.1 5	76.18	66.53	1.048	.9769	4.7250	7.5630	7.74

Bride reported the results of applications of arsenic to the soil under citrus trees. Paris green, white arsenic, and lead arsenate were used in quantities up to 1½ pounds per tree without any effect on fruit maturity as shown by either taste or chemical analysis. In the present work the quantity of arsenic applied to the soil was much greater than would result from the dripping of arsenical sprays over more than 250 years.

A seedling orange and a grapefruit tree more than 30 years old were chosen for the experiment. The treated and check trees were close to each other and on the same type soil, which was Norfolk sand, well drain-

ed by the Welch hydrogen-ion-concentration apparatus.

Penetration Into The Soil

The first analysis was made just after the 60 applications to the grape-

Table 5.—Effect of arsenic in the soil on the fruit of grapefruit and orange trees, Orlando, Fla., 1931

Variety	Parts of arsenic trioxide per million of soil		pH of soil	Fruit analyses		
	1 to 2 inches depth	8 to 10 inches depth		Acid	Solids	Ratio of solids to acid
Grapefruit	2,000	6.0	5.0	2.03	10.9	5.37
Check grapefruit	.04	.04	5.0	2.29	11.6	5.06
Orange	700	6.0	4.9	1.21	10.6	8.8
Check orange	.04	.04	5.0	1.14	9.2	8.1

fruit tree and the 14 applications to the orange tree had been completed. The results are given in Table 5.

After 30 pounds of acid lead arsenate (PbHAsO₄) had been applied to a slightly acid soil under the grapefruit tree, the first 2 inches of soil

growth, beneath both the sprayed and the unsprayed trees. Under the grapefruit tree where there were 2,000 parts of arsenic trioxide per 1,000,000 of soil, the following species were present: Spanish needle (*Bidens leucantha* L. Wild.), Mexican tea

(3) McBride, O.C., Marlowe, R. H., and Bassett, I. P. Guzeit determinations for arsenic in citrus fruit juices, leaves, twigs, and blossoms. Unpublished manuscript on file in Bureau of Entomology, U. S. Department of Agriculture.

(*Chenopodium ambrosioides* D.), and ragweed (*Ambrosia bidentata* Michx.). Under the orange tree, where there were 700 parts of arsenic trioxide per 1,000,000 of soil, Spanish needel, Mexican tea, and crab grass (*Eleusine indica* Gaertn.) were growing normally. All of these plants grew under the check tree also. Because of the protection afforded by the lead arsenate there was little insect injury on the plants where the soil was treated.

Loss Of Arsenic From The Soil

Lead arsenate, when applied to the soil as in the foregoing experiments, is not readily leached out by the normal rainfall of Florida. A year after the previous analysis a second one was made of the soil beneath the grapefruit tree, and 1,800 parts of arsenic trioxide per 1,000,000 in the 1 to 2 inch range were found, and 5 parts at the 8 to 10 inch depth. Even though this large quantity of arsenic was present around the roots of the tree for over a year, the tree was normal and set a good crop of fruit. The vegetation beneath the tree was the same as during the previous year.

It is very improbable that any arsenical injury would ever result from the dripping of the spray material after an application of fruit-fly bait. When it is considered that 1 pint of a spray containing 8 pounds of lead arsenate to 200 gallons of water is sufficient for a tree, the 30 pounds used on the soil beneath the grapefruit tree would make enough spray material for 6,000 applications.

Application of Lead Arsenate to Tree and Fruit — Time the Insecticide Remains on the Tree After Spraying

The first and most important consideration in determining the effect of arsenical insecticides on orange leaves or foliage is an exact analysis to find the quantity of arsenic, soluble and insoluble in water, that remains on the leaves at various intervals after spraying.

Samples of leaves were taken from a representative part of the tree and were selected from such trees as would give a cross section of the entire treated or untreated plot. Ten grams of green weight was found to be the most satisfactory sample and these samples were always run in duplicate. The determination of arsenic was made by the official Gutzeit method.

To determine the water-soluble arsenic, the leaves were kept for 10 minutes in 200 cc of distilled water, and this solution was then carefully filtered off and analyzed. The leaves and filter paper were then used to

THE CITRUS INDUSTRY

determine the water-insoluble arsenic.

To determine the total arsenic trioxide (As_2O_3), the arsenic was dissolved from the leaves with 2 per cent hydrochloric acid at room temperature (21° to 26° C., or 69.8° to 78.8° F.). The leaves, cut in half-inch strips, were kept in this solution for at least 10 minutes. At the end of this time they had usually turned yellow or brown. To check this method of removing arsenic from the leaves, many of the samples were afterwards digested and the remaining arsenic extracted by the distillation method. The additional arsenic found was less than 1 per cent of the total arsenic of the sample.

The greatest quantity of soluble arsenic was present immediately after spraying, and during the first month two-thirds of this disappeared. After this there was only a gradual decrease. The rate of disappearance of arsenic from citrus trees is shown in Table 6.

The trees had been sprayed with 8 pounds of lead arsenate to 200 gallons of sirup-sugar mixture. During the six months there had been 22.21 inches of rain.

Analyses were made from time to time of leaves from trees that had been sprayed 1 year or 18 months previously, and arsenic was still found in quantities such as 0.001 mg per 10 g of leaves. There was very little difference in the solubility or rate of disappearance when either sirup or sugar or lime sulphur was added to the lead arsenate mixtures.

Arsenical Content of Wood, Bark, Blossoms, and Small Fruit of Sprayed Trees

In an effort to determine what happens to the arsenic that is sprayed on citrus trees, analyses of thoroughly acid-washed bark and wood from limbs 1 inch in diameter, as well as blossoms and small, green fruit one-fourth to three-eighths inch in diameter were made. (3) In 191 out of 204 samples in which live bark and wood given 15 applications of 1 quart of fruit-fly bait spray were analyzed, the bark showed more arsenic than the wood. The arsenic in the bark ranged from 0 to 4.5 mg per kilogram of bark. In the wood, from 0 to 2.05 mg of arsenic was present per kilogram of wood. In the analyses of orange blossoms from similarly sprayed trees arsenic was found to be present in quantities ranging from 0 to 6.9 mg of arsenic trioxide per kilogram of sample. In the small fruit the quantity of arsenic present ranged from a trace to 0.16 mg of arsenic trioxide per kilogram of sample.

In all the analyses of bark, wood, blossoms, and small fruit made above, the samples were taken from trees to which no arsenic had been applied for at least four months. This shows that in the case of the wood and the blossoms and small fruit which were produced the next season after the sprays were applied, the arsenic had been translocated from the sprayed parts.

Effect of Arsenicals on Respiration of Orange Leaves

Respiration, one of the most vital processes carried on by living plants, was studied to determine how it was affected by various quantities of arsenic. The fact that arsenic stimulated respiration in *Elodea* had been established by Lyon. In this case he submerged *Elodea* in an arsenical solution and found that respiration was stimulated up to 160 per cent of normal.

(Continued next month.)

Horticulture Body Adopts Resolution For Arsenic Spray

The Florida State Horticultural Society in session in Lake Wales, April 13th adopted resolutions urging changes in the law so as to permit use of lead arsenate as spray on grapefruit and tangerines but not on oranges, as a measure to hasten maturity of fruit. This report of the resolutions committee was unanimous but there was a scattering of "nay" votes on the floor of the convention when the resolution was offered. The clearing house committee of 50, also in session there and on the same day, adopted a similar resolution.

Both bodies also adopted a resolution criticizing the governor's budget report for cutting so heavily on agricultural funds.

The horticulturists visited Mountain Lake during the afternoon of the 13th where the carillon recital was heard and a demonstration of power sprayers was given.

The following officers were elected:

President, John S. Taylor, Largo; vice presidents, David Fairchild, Coconut Grove, S. F. Poole, Lake Alfred, and C. I. Brooks, Davenport; secretary, Bayard F. Floyd, Davenport; treasurer, N. A. Reasoner, Oneco; executive committee members, F. M. O'Byrne, Lake Wales; H. Harold Hume, Glen St. Mary, and Forest D. Banning, Miami.

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CITRUS EXCHANGE OUSTS PRESIDENT

Action of the Florida Citrus Exchange at a meeting of the board of directors in Tampa on April 8, in ousting President William Edwards by a decisive vote of 14 to 5, was a distinct victory for General Manager C. C. Commander and the present set-up of the Exchange insofar as the board of directors is concerned. Certainly no stronger endorsement could have been asked by Mr. Commander and his friends.

Evidence is not lacking, however, that supporters of Mr. Edwards and his plan for a new set-up of the Exchange are determined to carry the fight into the sub-exchanges in an effort to bring about the adoption of the Edwards' suggestions.

A questionnaire mailed by the Lake Wales Highlander to more than 5,000 Exchange growers, of whom approximately 1,000 responded, showed 95 per cent favorable to the Edwards proposition on practically every point in his program. Of course this is not necessarily conclusive evidence that any such proportion of Exchange members hold similar views. No one can tell how the other 4,000 would have voted had they responded to the questionnaire. It does show, however, that a very large number of Exchange members are favorable to Mr. Edwards' proposals and there is every evidence that these members are planning to carry their campaign into the sub-exchanges for settlement.

There is at present no way of predicting with safety what the final outcome may be. The Commander adherents profess to believe that they are as strong with the growers as they have proven to be with the directors. On the other hand, the supporters of Mr. Edwards and his plan profess with equal confidence that they will win in the coming elections for directors by the sub-exchanges. Until these elections have been held no one would be justified in predicting the outcome, further than to predict that a number of new faces will be found in the directorate when it is organized in June.

In the meantime, the presidency has devolved upon Vice-President John S. Taylor of Largo,

a grower of magnitude and a supporter of the Commander faction.

As stated in these columns last month, there is much promise for the Exchange itself and for the industry as a whole in the great interest which has been aroused among growers and their evident determination to see that their interests are protected regardless of the effect upon personal ambitions or upon any marketing agency or organization whatsoever.

CONTROL MUST BE COMPLETE

Complaint is made that the effort to control grapefruit shipments through curtailment of picking and prorating of shipments among the various agencies has been made ineffective by the action of the few shippers who did not join in the movement.

The movement had the support of all Clearing House members, the Florida Citrus Exchange and many independent shippers affiliated with neither of these organizations. All told, shippers joining in the movement were said to represent fully 85 per cent of the grapefruit tonnage of the state. Yet the 15 per cent who failed to support the plan are said to have defeated its purpose by making shipments when and as they pleased.

This is regrettable, but easily believable. Fifteen per cent or ten per cent or any appreciable per cent of shippers can wreck any attempt to control shipments for distribution. This has been demonstrated time after time. The only effective method of controlling distribution is through the agency of some central organization having the support and adherence of all shippers, both independent and co-operative, and strong enough to enforce its rulings. Even then there would be plenty of competition from outside sources. When the effort was made in Florida this year, however, we had a monopoly on the supply and had the central organization had 100 per cent support, control of distribution would have been absolute.

HORTICULTURAL MEETING

The meeting of the Florida State Horticultural Society just closed at Lake Wales, was one of more than usual interest to citrus growers. Always emphasizing the importance of citrus in its programs, the Society this year gave even more attention to this great industry.

The success of the meeting was due in large measure to the efforts of President John S. Taylor, and Secretary Bayard F. Floyd, who were ably assisted by Treasurer N. A. Reasoner and the members of various committees.

Florida horticulture and particularly the Florida citrus industry owes much to the work of the Florida State Horticultural Society.

The next meeting will be held in Orlando next spring.

CLEARING HOUSE ELECTS

The Clearing House board of directors, recently elected, is a body of able men, numbering in its membership some of the largest growers and shippers of the state, prominent in the industry and recognized as leaders in the citrus field.

IMPRESSIONS

By Frank Kay Anderson

At the joint emergency meeting in March of growers from the Committee of Fifty and growers affiliating with the Exchange the conclusion was prompt, unanimous and decisive that action must be had to control the distribution of Florida citrus fruit to the larger centers, particularly to the principal auction markets. It was felt that up to that time the flood of fruit to these centers had kept market prices there unduly depressed, while the broadcasting of these auction prices over the country prevented any possibility of sales elsewhere at higher prices. This unanimous conclusion may open the way later to better conditions. When men agree upon what is wrong the remedy usually is found in short order.

However, the growers from the Committee of Fifty participating in this gathering were due for a considerable surprise. Shortly afterward they were told, and later they verified it for themselves, that the Florida Citrus Growers Clearing House association in its charter and by-laws had no authority to act thus to control the shipments of its members. When the Clearing House was in process of organization one of the principal points stressed was that it was intended to operate to "control the flow of fruit to the key auctions". That seems to have been lost sight of. The revised charter and by-laws, as reprinted in July 1932, contain not a single word to that effect. Some growers declare they are sure the provision was contained in the original agreements which growers signed in order to form the Clearing House; and are searching the places where they keep their papers in an effort to locate a copy of one of these original agreements.

Our personal nomination for the most deliberate man in Florida citrus circles is B. C. Skinner. Maybe that is because he is such an immensable big guy, and we have been accustomed to believe that large bodies move slowly. Yet the other day we met him on the street in Orlando in the middle of the afternoon. After starting that day in his Dunedin

office he had drifted up to Tallahassee for lunch, then had dawdled down to Orlando in the afternoon; and was expecting to ease on down to Dunedin for supper at his wife's house.

We note that the Winter Haven Chief and several other newspapers agree with our opinion, as expressed in the February issue, that the diorama of citrus prepared by the state commission in charge of our Florida exhibit at the coming Chicago world's fair does not do its subject justice and should not be used. Apparently there is a general sentiment in citrus circles to the effect that the diorama used by the Florence Citrus Growers Association two years ago, and used by the county commissioners of Polk county in their Orange Festival exhibit this year, far better depicts citrus. What will or will not be done about it we cannot guess. Earl Brown who is chairman of this world's fair commission is a darned good man; but it is our impression that the commission all along has been kept somewhat remote from citrus contacts.

By the bye, a reader takes us to task for getting wrong the name of the artist responsible for the Florence Villa diorama. It is Harry Bierce of Tampa, and not "Ambrose" Bierce, as we wrote it. Ambrose Bierce, as we now recall it, wrote a book—or something. During this morbiditorium, and for a short time previous, our subconscious hasn't been functioning as well as it might have.

Whatever else may come we are due to be shut next season of the surcharge of one cent per hundred pounds of fruits and vegetables, which has been added to our rail freight rates since January 4, 1932. Last December the rail lines asked permission to continue this surcharge. J. Curtis Robinson on behalf of our Growers and Shippers League hopped upon the proposal with both feet, insofar as fruits and vegetables go. The Interstate Commerce Commission on March 7 called off the surcharge on fruits and vegetables after September 30 next. That will mean a saving to Florida citrus growers of \$3.46 on

every carload of 384 boxes.

More important than this though is the indication of an awakening of the Commission, as expressed in part of the language of this particular decision. The Commission said: "The problems with which the railroads are confronted today cannot be solved by general increases in freight rates." Some fairly smart people have been telling the Commission precisely that for quite a long while. Now it apparently has sunk in.

There are some growers in other localities who find it hard to distinguish between B. Kilgore and D. Bilgore of Clearwater, the two well known West Coast citrus shippers. It is truly a coincidence that they should hail from the same town. B. (Barney) Kilgore is an old timer in the Florida citrus deal. For many years he has been one of the prominent Pinellas County shippers. He heads his own shipping concern, the West Coast Fruit Co. D. (David) Bilgore for the past several years has operated a packing house at Clearwater and in other ways participated in the Florida citrus deal, but properly speaking he is a New Yorker. The big village is headquarters for his operations, where his business connections have won him the name of King of the Puscart Men, so large a business does David Bilgore & Co. do with the operators of the puscartes which among other things peddle a vast volume of citrus fruits while they are in season.

In citrus circles it is generally accepted as a fact that the recent expansion of the operations of W. G. (Bill) Roe of Winter Haven have had the financial aid, or at least moral support, of David Bilgore of Clearwater and New York; but we have never heard any confirmation of this from either of these principals.

By the way, his friends call him Barney, but his parents named the head of the West Coast Fruit Co. Barnard Kilgore.

Just when among the general run of growers it was beginning to be as-

sumed that the Clearing House was dead, the corpse sat up and asked for a cigarette. And when Charlie Commander of the Exchange supplied something to smoke, so to speak, with his offer to have the Exchange join in a prorating and price control movement on grapefruit; and Lawrence Gentile held a match, in a manner speaking, with his announcement that he would approve of such a movement "one hundred per cent," things began to happen.

The Committee of Five agreed upon to handle such operations is a strong one, being composed of C. C. Commander, Lawrence Gentile, Wm. G. Roe, R. B. Woolfolk and William H. Mouser — three non-Clearing House members and two Clearing House directors, up to the time of the sudden revivification of that organization.

Earlier in this writing we mentioned that the Clearing House had no legal power to prorate or control shipments—it is our habit to jot down these notes from time to time during the month—and it is to be presumed that is to be cured. Undoubtedly that should be easy, a meeting which unanimously will change the by-laws, perhaps. Just a mere bag of tools, when the real will to get together is manifest.

We have been a bull on grapefruit right along, particularly on Marsh Seedless, and with such a committee to work out a shipping program which will give our grapefruit a chance to demonstrate its real value, we look for better things.

But don't look for too great returns from sheep-nosed fruit.

One newspaper dubbed the Committee of Five a Mussolini of the Florida citrus deal. That made a strong impression upon Sol. Wittenstein, the well known Orlando citrus grower. In privacy he was practicing the Fascist salute with the idea of thus greeting his fellow townsman Lawrence Gentile when next he saw him. It seems a friend told Sol that what he was practicing as the Fascist salute was in reality the Ku Klux Klan greeting sign, so Sol has abandoned the idea.

We haven't seen Sol. Wittenstein since these Winter Haven meetings, but just prior to that he was advocating that the Legislature create a Citrus Commissioner, independent of the Commissioner of Agriculture, the State Marketing Bureau, or anything

or everything else. It seemed Sol had in mind something of what Governor Murray had done earlier in Oklahoma to get petroleum production there upon a sane basis.

But there were others who held that if only a strong and well posted citrus man, with some close acquaintance with marketing problems, could be placed at the head of the existing State Marketing Bureau such a man if he chose to exert himself could, with the backing of the growers, accomplish a very great deal to straighten out some of the tangles and kinks in our citrus operations. That sounds logical, but it's our idea that the advocates of this move forget that the chief qualification for an incumbent of the State Marketing Bureau, up to date, is an ability to make speeches. It's our notion that no speech-maker could do the citrus deal any good. What we need is less talk and more action.

The State Marketing Bureau, for which the budget commission has approved \$69,000 yearly, is an adjunct of the State Department of Agriculture. Nathan Mayo as commissioner of agriculture must nominate a head of the State Marketing Bureau, the appointment, however, must come in form of a commission signed by Governor Sholtz.

Just been sitting and studying the program for the Florida State Horticultural Society meeting at Lake Wales, which will take place before before these lines appear in print. We are going to try to be there. If we fail to be there in the flesh, we shall be there in the spirit anyway. Our life membership in the society is something we treasure; and, besides, we'd like to find occasion at Lake Wales solemnly to doff our hat to L. B. Skinner, John S. Taylor, S. F. Poole, Bayard Floyd, H. Harold Hume, and a number of others, to whose courage and untiring devotion the continued life and usefulness of the society properly can be attributed.

To Major Winfield Scott McClelland of Eustis we acknowledge receipt of that letter he wrote us which was printed in the previous issue of THE CITRUS INDUSTRY. That was our first knowledge of it, but we agree with S. L. Frisbie's judgment that it was worthy of printing on its own. We note it was addressed to us at Tampa. Of course, it would have been forwarded to us out on the farm where we live and have our being near Altamonte Springs, something

more than one hundred miles from Tampa, if it hadn't been deemed interesting enough to print outside these personal columns.

Which somehow reminds us that while for the past few years we have been getting a big kick out of living away out here in the country, nearly four miles from our postoffice, on our grandfather's old place, this "splendid isolation" of ours also has a few handicaps. For instance, on the fourth day of March we left the farm here after breakfast, without seeing a morning paper, and leisurely drove over into Lake County to call upon J. A. (Jack) Heist of Chicago, now active head of the estate of the late John Heist, who did much to aid developments in Lake County near Lake Jem. He wasn't at the Carlton Nursery office, so after a bit we drove over to the house. The normally immaculate Heist person was in considerable disarray. We told him what we had in mind, and he said:

"Well, but you have picked about the poorest morning in the world."

"It that so?"

"Yes, didn't you know the Illinois banks had all closed?"

We admitted that was news to us, and were informed he had been, and still was, in close telephonic communication with Chicago and that he hardly had time to think of anything else. Then he asked again:

"You know the New York Stock Exchange has closed?"

"No."

"You know they are having a devil of a run on the Florida Bank at Orlando?"

"No."

"Well, you know the First National in Orlando suspended payments this morning?"

"No."

"Well, what the hell do you know anyway?"

So we went away from there, and came home here to the farm; and mostly we have been sticking around here pretty close since. It looks as if the less a guy knows these days the less he has to worry about.

At Maitland in Orange County an unique partnership between one town government and the American Fruit Growers Inc. to contribute to the aid of unemployed. The town had a considerable quantity of pipe on hand. This has been laid and fitted to provide irrigation, for which the town furnishes water, of a considerable plot near the AFG packing house, use of which that organization donates, and the result is a neat series of veg-

(Continued on page 18)

Dead Wood, Origin Citrus Melanose, Heavy This Year

Dead wood is the origin of all citrus melanose trouble, and recent drouths and often a lack of fertilizer has weakened the condition of many trees and caused much dead wood, explains E. F. DeBusk, citriculturist with the Florida Agricultural Extension Service. All of this favors heavy melanose infection this year. Many growers have not had the money to do much pruning, consequently spraying is the only alternative at this time, Mr. DeBusk said.

The prevention of the cause of dead wood is, of course, important. The principal causes of dead wood, Mr. DeBusk said, are an inadequate supply of nitrogen, drouth, root pruning through deep cultivation, diploia and withertip attacks on weakened trees, and other improper cultural practises. Growers can well afford to make every effort in removing these causes.

The best spray for melanose is 3-3-50 bordeaux mixture. Three to five quarts of oil emulsion to the 100 gallons of bordeaux makes it spread better and will aid in scale control. Some growers prefer casein as a spreader since it is usually necessary to follow with an oil spray in May or early June.

The primary aim of the bordeaux spraying should be to cover the young fruit and thus prevent the melanose pores from lodging on it and causing the characteristic blemish. This spraying must be done after the fruit has set and before the spores have been washed by rains from the dead wood onto the fruit. It is important to leave the trunk and large limbs of the tree unsprayed so as not to kill the friendly fungi which aid greatly in scale control.

CLEAN GROVES RARE

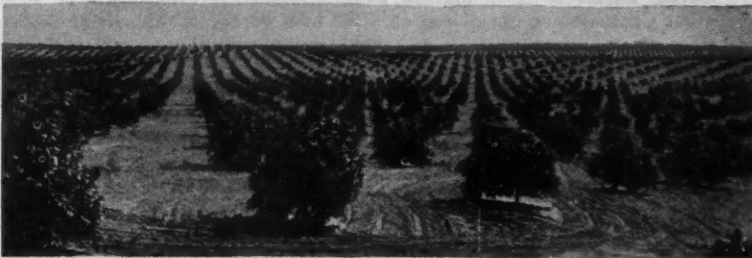
A clean cultivated citrus grove is hard to find in Highlands county. Cover crops, mostly crotalaria, are being grown on most of the County's 18,000 acres of citrus groves, reports County Agent L. H. Alsmeyer who investigated an intensive crotalaria growing campaign in 1926.

Spray watermelon vines with 4-4-50 bordeaux mixture to prevent anthracnose, the worst disease of the melon in Florida.

Both alcohol and turpentine are used to remove paint and varnish stains. They should be rubbed on and off quickly.

M. C. Dopler tells: *His Experience*

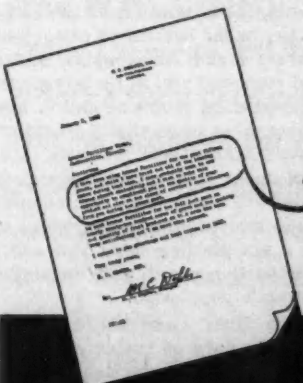
**"Results from twenty-two hundred acres
Reflect the Quality of Your Fertilizer"**



THOUGH busy with the management of nearly twenty-two hundred acres of grove, M. C. Dopler, manager, H. P. Groves, Inc., Lake Wales, Florida, takes time to write us a letter enthusiastically praising Armour's BIG CROP Fertilizer. Hundreds of letters of this type from men like Mr. Dopler come to us every year. They represent growers in every part of Florida and most of them are as enthusiastic in their praise of Armour's BIG CROP Fertilizer as Mr. Dopler. Read what Mr. Dopler writes---his statements are facts, not claims. As a basis for his

praise he gives his experience over a period of nearly fifteen years.

What Mr. Dopler has to say about Armour's BIG CROP Fertilizer is the strongest possible recommendation a grower can make for its use. Consider his experience when you make your own fertilizer selection. Make sure that you get the same complete ration of balanced plant food that Mr. Dopler gets. You can be sure of this when you buy Armour's BIG CROP Fertilizer. It is your best assurance of adding that necessary element of quality so important to your crop this year. But we are not asking you to take our word for this. It is confirmed in the letter reproduced below. Read what Mr. Dopler has to say:



I have been using Armour's Fertilizer for the past fifteen years, and while I have tried out all of the leading makes during that time, I have gradually come to use Armour's almost exclusively and I wish to take this opportunity to compliment you on the quality of your product and also on the class of service I have received from you during the years past.

Armour's
**BIG CROP
FERTILIZERS**

CITRUS
GROWING IN
FLORIDA

If you have not already received a copy of our new "Citrus Booklet" write for a copy today.

**ARMOUR FERTILIZER WORKS
JACKSONVILLE - FLORIDA**

Chambers Of Commerce Object To Drastic Reductions For Agricultural Institutions

The Associated Chambers of Commerce of Polk County, the Winter Haven Chamber of Commerce and other Chambers of Commerce of the state, have taken decided and definite action on the proposed drastic reductions in the appropriations proposed for the various agricultural institutions of the state.

Resolutions adopted by the Associated Chambers of Commerce of Polk County and the Winter Haven Chamber are herewith appended. Similar resolutions have been adopted by other Chambers of the state.

It has come to the attention of the Associated Chambers of Commerce of Polk County, that our agricultural Institutions of the State are threatened with virtual extinction because of drastic cuts in their income, which has been recommended by the State Budget Commission.

While the State Budget has been reduced 25%, the Budget Commission recommends that the Experiment Station and Plant Board receive less than 20% of the amount appropriated for their work last year.

Such drastic cuts could be justified only in case these departments have been operated very extravagantly in the past or their work is of very minor importance. We have never heard either alleged. We show below the appropriation made for each of these institutions last year and the amount recommended for the next year.

Appropriation Fiscal Year Ending June 30, 1933, Experiment Station, \$325,233. Recommended per annum for next two years, \$50,000.

Appropriation Fiscal Year Ending June 30, 1933, State Plant Board, \$235,000. Recommended per annum for next two years, \$25,000.

We ask why the Budget Commission has recommended cuts to our Agricultural Institutions so tremendously in excess of the cuts meted out to other institutions and State departments.

The Experiment Station at Gainesville has sub-stations or field laboratories in several points in the State, all of which are supposed to be sup-

ported from the \$50,000 budget. Continuity is extremely important in scientific investigations. If a scientific worker is discharged before his investigation is completed, the amount expended on his project up to the date of his discharge, is lost. Does the Budget Commission expect us to believe that the Experiment Station and the State Plant Board can be operated and carry on all the present lines of work on an appropriation which has been cut 80%? If the other institutions require 75% of their last year appropriations to function properly, how can our Experiment Station and State Plant Board operate upon only 20% of last year's budget?

The Experiment Station has added millions to the wealth of the State in its studies resulting in the control of disease and insect pests, in making Everglades soil productive through the use of blue stone, in the control of bean yellows, in originating new varieties of tobacco, in the introduction of new grasses and other plants, in its solution of the salt sick cattle, in the control of cottony cushion scale and citrus aphids, melanose and stem-end rot, in its investigations of marketing problems and in innumerable other ways vitally effecting the state's agricultural interests. Studies now under way on agricultural problems will bring new or abandoned lands into profitable use, place them on a tax yielding basis and add further to the wealth and happiness of Florida's population.

The State Plant Board is charged with the duty of protecting our agriculture from insect and disease invasion. A horde of pests menace us from South America, the West Indies and other parts of the world. As our commerce with these parts of the world increases, our danger increases. Last year the Quarantine Department of the State Plant Board, which is charged with intercepting pests at our ports, cost \$42,000. We cannot afford to reduce this Department. It should be increased. The Grove Inspection Division is our second line of defense, designed to locate any pests which may have gotten into the

state in some way.

Last year the State Plant Board, realizing the need of drastic economies, put these into effect voluntarily and operated for 12% less than the amount appropriated for it. This we feel was showing the proper spirit.

We believe that the agriculturists, having borne the brunt of increased taxation, are as anxious as any other class for real economy. But we can see no reason why the institutions which benefit them particularly, should be singled out for a terrific and almost annihilating cut. We are perfectly willing to see these institutions accept cuts in line with those given to other institutions, but will resist the drastic cuts proposed, realizing that in the end, they will prove most costly.

Very respectfully,
Associated Chambers of Commerce
of Polk County.

Winter Haven Chamber Acts

WHEREAS, Florida is primarily an agricultural State, and

WHEREAS, All forms of agriculture and horticulture in Florida are now laboring under many handicaps, and

WHEREAS, The Florida Agricultural Experiment Station and State Plant Board are the two institutions in Florida to which the agricultural and horticultural interests may look for guidance and protection, and

WHEREAS, The State Budget Commission has recommended a reduction of more than 80% in the budgets of these two institutions, when those of the State as a whole have been reduced only 25%, and

WHEREAS, It is obviously impossible for the Experiment Station and its various sub-stations located in different parts of the State to operate on less than 20% of a normal budget and that adequate protection of the agricultural and horticultural interests against foreign pests and diseases cannot be given by the State Plant Board with less than 20% of a normal budget, and

WHEREAS, To force discontinuance of projects along insect, disease
(Continued on page 18)

SUMMER FERTILIZING

... Calls for

Genuine HUMBOLDT Guano

SUMMER subjects your groves to constant weather hazards. Even if you could be sure of perfect weather with just enough sun and just enough rain, you would want the undisputed excellence of Genuine HUMBOLDT Guano. When you can't rely on the weather, you have to be still more certain of your fertilizer. And that calls for Genuine HUMBOLDT Guano, too.

Experience is the best example to follow. During recent years Florida's most successful growers have overcome summer's uncertainties by using NACO Brand Fertilizers containing plenty of Genuine HUMBOLDT Guano. They know its value for continued release of plant food during drought; its ability to resist leaching by heavy rains.

The NACONITE Line...with all of the ammonia from Genuine HUMBOLDT Guano if desired... offers a truly productive and economical summer fertilizing program for citrus growers. Consult our field representative about the analysis. Fifteen different analyses are offered. In some instances our field men may recommend Genuine HUMBOLDT

Guano in combination with potash which can be obtained at a surprisingly low per tree cost...A real opportunity for practical economy.

THIS summer be guided by successful experience. Use NACONITE and NACO Brand Fertilizers containing generous amounts of Genuine HUMBOLDT Guano!



LOOK FOR THE GUANO BIRD
TEST FOR THE GUANO SMELL
These two together mean Genuine HUMBOLDT Guano

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Analysis Of The Emergency Farm Mortgage Act Of 1933

By W. I. MYERS

ASSISTANT TO HENRY MORGENTHAU, JR., GOVERNOR, FARM CREDIT ADMINISTRATION, WASHINGTON, D. C.

TITLE I.

1. For two years authorize Federal land banks to issue bonds at interest rate not to exceed four per cent, the interest of which is guaranteed by the United States. Maximum amount to be two billion dollars. Proceeds to be used to make new mortgages or refinancing existing mortgages. (Sec. 1.)

2. In order to reduce and refinance existing farm mortgages, Federal land banks are authorized to exchange bonds for or to buy outstanding farm mortgages on best terms possible passing the savings in principal and interest on to farmer borrowers. (Sec. 2.)

3. Maximum interest rate to borrowers on old and new Federal land bank mortgages not to exceed four and one-half per cent for five year period. Appropriation of \$15,000,000 to be used to compensate the Federal land banks for loss in interest during first year. (Sec. 4.)

4. Neither old nor new borrowers from Federal land banks required to pay installments on principal of mortgages for five year period. (Sec. 4.)

5. For five years authorize Federal land banks to grant necessary extension of payments to deserving old and new borrowers. Such extensions to be financed by loans from the United States. An appropriation of \$50,000,000 authorized for this purpose for ensuing fiscal year. (Sec. 3.)

6. Raise maximum limit of Federal land bank mortgage loans from \$25,000 to \$50,000 on approval of Farm Loan Commissioner. (Sec. 5.)

7. Authorize Federal land banks to make direct loans to farmer-borrowers where no local farm loan associations are available on condition that farmer agrees to join such association when there are enough borrowers in the community to establish one. Interest rate on direct loans to be one-half per cent higher than on loans through local associations but rate to be reduced when borrower joins local. (Sec. 6.)

8. Authorizes receivers for joint

stock land banks to borrow from Reconstruction Finance Corporation on security of receivers' certificates in order to pay taxes on real estate. (Sec. 7.)

TITLE II.

1. Prohibits joint stock land banks from issuing tax-exempt bonds or making new farm loans except in connection with refinancing of existing loans. (Sec. 201.)

2. Authorizes Reconstruction Finance Corporation to loan up to \$100,000,000 to joint stock land banks at four per cent on security of first mortgages, provided

(a) Joint stock land bank reduces interest rate on mortgages to five per cent per annum,

(b) Agrees not to foreclose on mortgage for two year period except in unavoidable circumstances.

These provisions will make it possible for joint stock land banks to liquidate their affairs in an orderly manner giving consideration to farmer-borrowers and to security holders. (Sec. 202.)

TITLE III

Allocates \$20,000,000 of R. F. C. funds for loans through the Farm Loan Commissioner for the following purposes:

1. To enable farmer to redeem and/or repurchase farm property lost through foreclosure.

2. To reduce and refinance junior obligations.

3. To provide working capital.

These loans to be under supervision of Farm Loan Commissioner using machinery of the Federal land banks. Loans to be made direct to farmers. No loan in excess of \$5000. Total of first and second mortgage, if any, not to exceed 75 per cent of normal value of farm and farm property. Repayment in ten equal annual installments plus interest at five per cent but no payment on principal required for first three years.

Principal purpose of these loans to enable farmers to buy back foreclosed farms and to make small, rea-

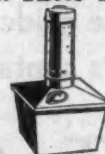
sonably safe, second mortgages to refinance junior liens and unsecured debts on a scale down sufficiently drastic to permit good farmers to pay out. (Sec. 301.)

TITLE IV.

Authorizes Reconstruction Finance Corporation to make loans not to exceed \$50,000,000 to drainage, levee, irrigation and similar districts to reduce and refinance indebtedness. Loans for period not exceeding forty years to be secured by bonds issued by borrower which are lien on real property or on the assessment of benefits. Such loans to be made only on condition that the borrower shall reduce indebtedness of the users of such project in amounts corresponding to reduction of its debt. No loan to be made until after appraisal has been made of the property, taking into consideration average market price of bonds over six months period ending March 1, 1933 and the economic soundness of the project. (Sec. 401.)

It's too much to expect good calves from poor mothers, but a purebred sire will help.

The Improved
RIVERSIDE
Truck-Deciduous-
& Citrus Heater
It Kills Frost at little Cost



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On Hand at Orlando



Save Your Capital Investment

by conserving the
energy in your soil

Prices for farm products are low, it is true. But they are not always going to be. Already better times are on the way.

In the meantime remember this, Mr. Florida Grower — you have real cash money invested in your grove and truck farm — money from which you expect an income. It will pay you to carefully guard that investment. It will pay you to consider the future.

Improper fertilization practices have depleted the soil of many groves and truck farms to the extent that satisfactory crops will be next to impossible for years to come. The average fertilizer does not return to the soil all the plant foods taken out by growing crops. In fact, certain combinations of materials cause chemical reactions that are actually harmful — reactions that leach away essential elements, leaving the soil sterile and unproductive — burned out! That's why we say

"Play safe with Gulf Brands"

Gulf Brands are formulated and blended for specific crop purposes. Rich in long-lasting, natural organics they assure your crops safe, uniform crop nutrition. They are never cheapened through the substitution of low-priced, water-soluble synthetics. You can depend on Gulf Brands — always.

Let the Gulf Field Man in your section tell you how Gulf Brands combined with dependable Gulf Service can help you to greater profits.

THE GULF FERTILIZER COMPANY

TAMPA, FLORIDA

Stocks at convenient points throughout the State



IMPRESSIONS

(Continued from page 12)

etable gardens. The products of these will go quite a way toward feeding the families of those who are cultivating them. C. N. (Pinky) Williams of the AFG has named the undertaking Prosperity Gardens; but Paul Rogers who is responsible for the idea can't tell you why.

Sitting at lunch with Messrs. Bazemore and Richards of the Nitrate Agencies group of philanthropists and the conversation inevitably turned to the economic situation. We opined something to the effect that now while we were crawling about on the bottom was as good a time as any to get quite a few things straightened out. Jim Bazemore snorted. "I remember," he said, "three years ago in Lake Wales, sitting and listening to Roger Babson. He said something about things looking up; that lying as we were then on the bottom there was nowhere to look but upward. Now that was three years ago." From which we deduce that the well corner and the equally well known bottom are, in the language of Einstein, somewhat relative.

Pausing on an Orlando street corner for a brief chat with Lorenzo Wilson, and he was very sure that the financial situation was clearing up; that there were plenty of signs of an easing-up which promised much. Three days later we ran into Bayard F. Floyd on the same corner. For a bit we talked of the coming program of the Horticultural Society then something was said about business conditions. We were quite optimistic in our utterances. Bayard Floyd didn't contradict us, but there was a questioning in his look which bothered us. So we told him how we had gotten our information right on that corner, and from whom it came. He brightened up considerably; and from then on we were in substantial agreement.

Among our Florida citrus growers are a certain number who own farms or farm lands of one kind or another in other states. These, we find, are the greatest optimists we have with respect to citrus conditions. Let the owner of a wheat farm in Nebraska or North Dakota explain to you how much better things have been, and are, with his citrus property than with his grain farm, and this attitude of mind is quite understandable.

A group were discussing the performances and characteristics of a man of large prominence in the Flor-

THE CITRUS INDUSTRY

ida citrus world who has been among us here in Florida only a relatively short while. Said one: "Aw, stop your criticising. He can't help it. Do you know I have been studying that situation, and it is all a matter of absent-mindedness. There are two types of absent-mindedness, A and B. Type A is what Blank has; and type B is temporary."

CHAMBERS OF COMMERCE OBJECT TO DRASTIC REDUCTIONS FOR AGRICULTURAL INSTITUTIONS.

(Continued from page 14)

and other investigational lines would mean the loss of all funds already spent on many of these projects, and the loss of trained experts whose services have been devoted to those practical projects, and the virtual suspension of operations of buildings and equipments whose value—exclusive of lands—is not less than a half million dollars; Now therefore be it

RESOLVED, That the Winter Haven Chamber of Commerce urge every individual interested in the agricultural and horticultural industries of the State to make known to their representatives at the State Legislature, that such an attempt to strangle the existence of the Agricultural Experiment Station and State Plant Board, should not be tolerated; and be it further

RESOLVED, That such reductions of appropriations out of all proportion to those recommended for other institutions are dangerous and uncalled for and that said representatives should consider it their paramount duty to see that these institutions receive adequate appropriations to continue their existence and valuable contributions to the prosperity of the State, and be it further

RESOLVED, That copies of this resolution be mailed to Governor Sholtz, to each member of the State Budget Commission, the State Senator, the Representatives of Polk County, and the Press.

Passed and Approved this 29th day of March, 1933.

Winter Haven Chamber of Commerce
Signed: W. H. Anderson,
President.

Attest: Signed, J. B. Guthrie,
Secretary.

Health is so necessary to all the duties as well as pleasures of life that the crime of squandering it is equal to the folly.—Selected.

Laughing at a child's fault one day and punishing the child for the same fault the next day is not good for the child.

Crotalaria Enables Chinese Ladybeetle To Live In Grove

Crotalaria striata in the citrus grove will provide feed for the Chinese ladybeetle during the late summer, and may enable this beetle to live over in the grove, says J. R. Watson, entomologist at the Florida Experiment Station.

This beetle introduced to Florida several years ago to aid in controlling the citrus aphid. It is a splendid aid in aphid control, but has been difficult to carry over in the grove from year to year.

Observations by Mr. Watson have shown that the ladybeetle has become established in at least two large groves in the state, both of them in Orange county. During late summer when aphids are so scarce that ordinarily the ladybeetles starve to death W. L. Thompson of the Department of Entomology has observed the beetles feeding on nectar secreted by the Crotalaria striata. The nectar is secreted by certain glands at the base of the flowers, called extra-floral nectaries. Mr. Watson suggests that the striata species of crotalaria is more desirable for the purpose than the spectabilis, since this species secretes more nectar and its flowers appear over a longer period during late summer.

Numbers of Florida citrus growers are interested in establishing the Chinese ladybeetles in their groves, but to date most of them have been unsuccessful. Mr. Watson believes that if the aphids are introduced this spring and crotalaria is planted in the grove on which they can feed during late summer, they may be established.

Mr. Watson points out that ants are enemies of the Chinese ladybeetle and should be controlled as far as possible in groves where efforts are being made to establish this beetle.

FOR SALE

Lists of Florida Citrus Growers compiled from recent survey of groves, arranged by counties. Name, address, acreage and legal description. Also list wealthy residents of Florida.

W. L. Lamar
P. O. Box 333
JACKSONVILLE, FLA.

Sticks Better
Stays Better
Costs Less



Fico Lime-Sulphur

Needs no additional Lime. Thus a saving in first cost and a saving in labor. But the added value is the real consideration. Use Fico Lime-Sulphur, note how it sticks, how it stays put, how it controls the pests which are "boarding" at your expense.

Florida Insecticide Co., Apopka, Florida

The Greatest
Carrier of
Bacteria-



Florida Peat Humus

Composted with goat manure, Florida Peat Humus proves to be the greatest bacteria carrier in the agricultural field. Bacterial count exceeds that of highest stable manures by more than one-third. Ask us for analyses from the famous Wiley Laboratory, and details.

Florida Humus Company, Zellwood, Florida

RESEARCH IN RELATION TO THE CITRUS INDUSTRY

(Continued from page 4.)

trees and soil in good shape and at the same time lower his costs of operation. The demand is naturally for ways and means to accomplish this. In our eagerness to reduce costs, both in agriculture as well as in industry generally, we are sometimes led to adopt new methods which are pure theory and which many times are disappointing and costly. I venture to state that during the past five years unproved theories in agriculture have cost the growers of Florida nearly as much as cold, hurricanes and the Mediterranean fly in actual and lasting damage to trees, and quantity and quality of fruit.

I repeat that there is no royal road to learning. The finding of new facts about old things or customs; the discovery of better or more economical methods of cultivation; the development of new plants, insect or disease controls are beyond the power of the average grower.

Dr. Newell, in the booklet "Research," dated March 1, 1933, has put the whole situation into a few well chosen words:

"Obviously the farmer cannot undertake research in his own behalf. His training, his knowledge, his viewpoint, his finances and his facilities, make it impossible for him to undertake such lines of work and the results, unless secured by trained men working on a scientific basis, are of little value. The farmer is not and cannot be entomologist, plant pathologist, chemist and animal nutritionist all in one."

Again—"In agriculture research is just as important as it is in commercial lines. It bears exactly the same relationship in the agricultural field that it does in the manufacturing field. Agriculture in America has developed to its present position because of research. As a result, the ravages of insects have been reduced or overcome. The life histories of many plant diseases have been determined and means of combatting them have been made available. New plants have been introduced through the efforts of plant explorers and plant hybridizers. New crops have come into existence. New means of enriching lands and maintaining their productivity have been brought into use. In short, what agriculture is today has been made possible through research."

At the present time there are many problems confronting the citrus grower which can only be solved by careful and continued scientific re-

search. Among the current troubles are copper leaf, creasing, splitting, maturity, new plant foods and an endless list of others. The solution of these may be found quickly or it may be years. Sooner or later scientific research will find the cure, control or answer.

I feel very sure that we as growers and citizens of Florida have not appreciated the imperative necessity of agricultural research as much as we should. With low prices, keen competition, diminished public buying power, you and I need to find out how to grow better fruit at lower cost.

Florida is not suffering now as keenly as other states and we should

be the first to profit by the upward trend of business. Research, conducted by trained men with ample facilities, will aid us to obtain and maintain a leading position.

Naturally, there is necessity for the most rigid economy in the expenditure of public funds. To be wasteful now is nothing short of criminal.

Let us growers of citrus take a greater interest in our Agricultural Institutions at Gainesville. We can help them by making our troubles known and by encouraging them in their work. Unless adequate means are provided for efficient and continued research work, the citrus industry and the returns therefrom will suffer.

In the market with

BROGDEX

Florida fruit is going into markets where Brogdex is pretty well thought of. With plenty of fruit to choose from this market preference is certain to mean that Brogdex brands will always be first choice and that there will be plenty of buyers for them.

With the warm weather coming on decay and shrinkage are increasing and it becomes more and more necessary to ship un-Brogdexed fruit under refrigeration to protect it as much as possible.

These are problems that seldom worry the Brogdex shipper. He ships standard vent and makes sound delivery throughout the season. Ice is seldom used.

Buyers like standard vent shipments—the fruit opens up so much better. There is no sweating when the fruit is taken from refrigeration, the wraps are dry and the original shine has not been dulled by moisture.

Then the more attractive appearance characteristic of Brogdexed fruit and its well known better keeping qualities make possible the higher prices usually received. These are advantages worth thinking about.

What these mean to the Brogdex grower are best shown in the New York auction market this season. Here are the prices paid for Brogdexed and un-Brogdexed fruit:

GRAPEFRUIT				ORANGES			
Month	Brog.	Non-B.	Diff.	Month	Brog.	Non-B.	Diff.
Nov. avg.	\$3.53	\$3.04	\$.49	Nov. avg.	\$3.32	\$3.15	\$.17
Dec. avg.	2.83	2.23	.60	Dec. avg.	3.26	2.78	.48
Jan. avg.	2.60	2.10	.50	Jan. avg.	3.22	2.63	.59
Feb. avg.	2.35	2.02	.33	Feb. avg.	2.71	2.23	.48
Mar. avg.	2.15	1.74	.41	Mar. avg.	2.52	2.30	.22

Florida Brogdex Distributors

Inc.

B. C. Skinner, President

Dunedin, Florida

He was the first to try it . . .

A man with a thousand acres of citrus groves in his care has a real job on his hands. He doesn't overlook any opportunity to improve the conditions and production of the trees in his charge.

Such a man is Johnnie Olson, citrus grower and grove manager, of Dundee. The success of his groves and the increasing acreage being placed in his care are tributes to his ability and good judgment.

Several years ago when Agrico, the fertilizer with the extra plant foods, was introduced in Florida by this Company, Mr. Olson bought a few tons for experimental purposes to see just how good it was. What did he find out? This recent letter from him gives some interesting information.

Dundee, Fla., Nov. 14, 1932

Gentlemen:

Four years ago I bought a few tons of Agrico for Citrus to use in an experimental way. This was the first Agrico, so I have been told, that was used on citrus trees in this State. Frankly at that time I had little confidence regarding the unusual, extra plant food elements in this new fertilizer.

After testing Agrico thoroughly for two years I am convinced that it has something other fertilizers haven't got. Where Agrico was used the trees were healthier and yielded more and better fruit and in every way demonstrated the superiority of this fertilizer. Today more than 50 per cent. of the groves I fertilize and care for are "Agrico groves" and I am often told that these are the best groves in this section. My customers now demand Agrico because they have seen the results in their own groves. As a matter of fact the use of Agrico for Citrus is getting to be common talk among the growers in this locality and I know many will use it this year who have not done so before.

Conditions in the fruit business, as everyone knows, have been bad and growers weigh very carefully any additional cost in



Mr. John L. Olson of Dundee.

fertilizers. But as far as my growers are concerned they have found Agrico to be worth much more than its small extra cost.

Very truly yours,

JOHN L. OLSON.

There's a reason for the better results obtained with Agrico. In addition to the usual nitrogen, phosphorus and potash contained in ordinary fertilizers, Agrico contains extra plant foods that provide extra crop-producing power. It represents a step forward, a real improvement in fertilizers. Agrico is made only by The American Agricultural Chemical Company, makers of the well-known Bradley and Bowker Brands.

If you have already decided upon the fertilizer you are going to use on your next application we don't ask you to change your mind, we only ask that you give Agrico a fair trial on at least a part of your grove and compare the difference in results. Remember Mr. Olson's experience represents performance in not one but a variety of groves and not just one application but applications covering a period of years.

* * *

This is the 43th year that this Company has been making fertilizers especially adapted to Florida conditions. During this time we have had a great deal of experience with Florida's various crops and soils. To make this experience available to growers we organized our Service Division. This department, through our field men, can be of real help to you. Its service is at your disposal without charge. A call to our office will bring a capable service man to your grove.

HORACE BOWKER, President.



The AMERICAN AGRICULTURAL CHEMICAL CO.
Makers of BRADLEY'S, BOWKER'S and AGRICO Fertilizers
PIERCE, FLA.

AGRICO—the fertilizer with the EXTRA plant foods

EFFECT OF LIME (CALCIUM HYDROXIDE) ON THE COMPOSITION OF CONNER, VALENCIA, AND SATSUMA ORANGES.

(Continued from page 7)

months throughout the growing season, and regardless of the quantity present on the leaves, there was no difference in either catalase activity

on both the sprayed and the unsprayed trees or parts of trees.

Effect of Hydrated Lime on Valencia Oranges (Lake Alfred, Fla.)

In order to determine the effect of lime on Valencia oranges the following experiments were conducted. Two adjacent trees growing on Norfolk sand, slightly acid soil, were used in each case. The trees were about 8

May 5, June 30, July 16, and August 18.

In March, 1932, there was no significant difference, as to color, texture, or thinness of peel, between fruits taken from the trees sprayed with lime and those not sprayed. Analysis was made of the fruit from the lime-sprayed trees and from the check trees, and again no significant difference was found in the acid-solids ratios or total sugars, as is shown in Table 3.

The Effect of Lime on Satsuma Oranges (Spring Hill, Ala.)

To determine if applications of hydrated lime affected the composition of Satsuma oranges, the experiment herein reported was carried out. A

Table 1.—Lime Residue, as Calcium Oxide, on Leaves of Conner Orange Trees During the Season After Spray Treatment With Hydrated Lime Ca(OH)₂ in June.—Orlando, Fla.

Treatment	CaO on 10 gm of green leaves			
	June 4	July 11	Aug. 7	Sept. 4
Lime 2½ lbs. Ca(OH) ₂				
Water 50 gal. (4 trees)	22.2*	7.0	6.6	1.6
Check (4 trees)	0.0	0.0	0.0	0.0
5 lbs. Lime on Soil				
(Hoed in) (2 Trees)	0.0	0.0	0.0	0.0

* Average of two determinations.

or respiration between the sprayed and unsprayed leaves. The catalase activity of the sprayed leaves was neither stimulated nor decreased by the calcium present. The respiration, measured by carbon dioxide (CO₂) elimination, was not stimulated, as was the case with some other materials, but remained normal throughout the experiment.

Effect on Fruit Composition

Four times during the later growth of the fruit, analyses were made of the acid soluble-solids content of the fruit juice. These were made according to the method of fruit analysis used by the State of Florida for determining legal maturity of citrus fruit. The soluble solids were determined by the Brix hydrometer and the acid by titration with sodium hydroxide. All analyses were made from one composite sample of 12 fruits

Table 3.—Effect of Hydrated Lime on Valencia Oranges (1)
Lake Alfred, Fla.

Treatment	Fruit No.	Average Weight Gm	Juice Per Cent	Citric Acid Per Cent	Brix At 17 ½° C.	Ratio Acid To Solids	Sugars (Cu2O)		
							Sucrose Per Cent	Invert Per Cent	Total Per Cent
Hydrated lime 20 lbs. to 100 gal. 1 tree	11	171.5	52.75	1.24	15.3	1-12.3	4.98	6.49	11.68
Same as above; 1 tree	15	183.5	51.79	1.28	14.2	1-11.1	4.57	5.91	10.72
Check; 2 trees	15	172.8	52.04	1.13	15.3	1-13.5	5.32	6.37	11.97
Check; 2 trees	15	164.2	57.37	1.44	15.4	1-10.7	4.87	6.62	11.75

(1) Analysis made by Dr. R. W. Ruprecht, Chemist, Florida Agricultural Experiment Station.

years old and approximately 8 feet high. The material was applied with a barrel-type sprayer at 80 to 100 pounds' pressure. Twenty pounds of hydrated lime were used to 100 gallons of water, and approximately 3½ gallons of spray were applied to each tree. The trees received four different applications during 1931—

14-year-old orchard of fairly uniform trees on Orangeburg sandy loam interplanted with pecans was selected for the experiment. The rows contained from 11 to 17 trees. Three rows were sprayed with hydrated lime at the rate of 20 pounds to 100 gallons of water, and three rows were sprayed with lime at 20 pounds plus calcium caseinate, 2 pounds, to 100 gallons of water. The sprayed rows were alternated with unsprayed rows. Applications were made June 22 and September 2, 1931, with a power sprayer at 250 pounds' pressure.

Samples of oranges were taken from each row on October 26 and November 10 for juice analyses. The latter date was at the time of the first picking. Two oranges were selected at random from each of 6 trees in each row to make the sam-

Table 2.—Fruit Composition of Conner Oranges as Affected by Treatment With Lime (Calcium Hydroxide) in June.—Orlando, Fla.

(2 Trees Per Plot) Treatment		Aug. 15	Date of Analysis		
			Sept. 2	Oct. 7	Nov. 25
Check. Unsprayed halves of trees	(Acid)	3.86	2.70	1.97	1.59
	(Solids)	9.15	9.3	9.6	11.2
	(Ratio)	2.72	3.45	4.87	7.40
Lime 2½ lbs. Water 50 gals. Sprayed halves of trees	(Acid)	3.44	3.21	2.03	1.76
	(Solids)	9.30	9.0	9.6	12.7
	(Ratio)	2.70	2.80	4.74	7.2
Lime 2½ lbs. Water 50 gals. Total trees sprayed	(Acid)	2.41	3.10	2.10	1.57
	(Solids)	7.60	9.10	9.60	11.5
	(Ratio)	3.15	2.94	4.56	7.30
5 lbs. lime on soil (Hoed in)	(Acid)	3.16	2.23	1.74	1.40
	(Solids)	9.72	9.37	10.2	12.00
	(Ratio)	3.07	4.20	5.59	8.59

taken from the two trees in each test. The results of these determinations are shown in Table 2.

The fruit composition was not changed by the application of lime either to the leaves or to the soil. The fruit matured at the same rate on both the sprayed and the unsprayed trees and had approximately the same quantities of acid and soluble solids in the juice. The trees and fruit were not in any noticeable way affected by the lime application, for the color and growth of both leaves and fruit were normal and the same

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Large Rooms
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ples of 12 fruits from each row for analysis. The juice was extracted by pressing halves of the oranges over a glass cone extractor. Most of the pulp was removed by passing the juice through wire gauze. The juice was then filtered through a coarse filter paper and the filtrate used for the determinations.

From the results of these analyses, assembled in Table 4, it will be seen that there is no significant difference in the solids and acid of oranges taken from sprayed rows and unsprayed rows. In addition, there was no visible difference in maturity at any time during the season.

Orlando, Fla., in June had no effect on the respiration or catalase activity of the leaves and did not affect the fruit composition although by analysis considerable lime was found present on the leaves throughout the growing season.

Four applications of 20 pounds of lime per 100 gallons of water made in May, June, July, and August to Valencia orange trees at Lake Alfred, Fla., had no effect on the fruit composition, as shown by analyses made at picking time.

Two applications of lime, 20 pounds per 100 gallons of water, made in June and September to Sat-

ONE-FOURTH OF GROWERS ATTEND CITRUS SCHOOLS

The Lake County citrus growers' schools now have a membership of 235, one out of every four growers in the county, reports County Agent Clifford Hiatt. The fourth of these schools was recently completed in Tavares. At 12 consecutive meetings the County Agent and other citrus specialists discussed citrus problems with the growers. The growers voted to continue meetings once each month for similar discussions.

County Agent Hiatt recently conducted two grove tours to leading groves over the county on which he was demonstrating certain improved practices. Ninety growers made at least one of the tours.

HOME-CANNER FOOD SUPPLY

The farm women of Jefferson county who are members of the home demonstration club will have little worry in feeding their families during the next year. Miss Ruby Brown, the home demonstration agent, reports that aside from the fine gardens and orchards now growing over the county, these women have filled more than 13,000 containers that are now in their pantries.

BAKING AT HOME

The women of Pinellas county are going in for more home baking and canning, reports Mrs. Joy Belle Hess, home demonstration agent, who during March conducted 14 demonstration schools in home baking and canning in as many communities.

The Florida Agricultural Extension Service at Gainesville has available for free distribution an interesting bulletin on foundation plantings for Florida homes.

Avocado flowers, unlike those of most other plants in nature, shed pollen at a time when the stigmas are not receptive. To secure pollination and fruit setting, it is necessary to have interplantings of varieties of avocados which will pollinate each other.

Credit, where needed and used wisely, is most necessary. But we should not soon forget the credit lessons handed to us by the depression.

The friendly cow all red and white,
I love her with all my heart;
She gives me cream with all her might
To eat with apple tart.

—Stevenson.

Table 4.—Analysis of Orange Juice.— Spring Hill, Ala.

(Six Trees Per Row) Treatment	Row No.	October 26			November 10		
		Sugar Brix (1)	Acid	Ratio	Sugar Brix	Acid	Ratio
Ca(OH) ₂ 20 lbs.	(9	10.1	1.35	7.5	9.9	1.30	7.6
Water 100 gals.	(12	9.5	1.32	7.2	9.25	1.07	8.6
	(14	9.7	1.63	5.9	9.5	1.41	6.7
Average		9.7	1.43	6.8	9.5	1.26	7.5
Ca(OH) ₂ 20 lbs.	(16	9.5	1.41	6.7	9.9	1.25	7.9
Ca Caseinate 2 lbs.	(19	9.9	1.53	6.5	10.1	1.30	7.8
Water 100 gals.	(21	10.1	1.22	8.3	9.7	1.15	7.4
Average		9.7	1.40	6.9	9.9	1.22	7.7
	(10	9.25	1.26	7.3	9.7	1.13	8.5
	(13	9.7	1.22	7.9	9.7	1.08	9.3
Checks	(15	9.5	1.50	6.3	9.9	1.26	7.8
	(18	9.7	1.33	7.0	10.1	1.23	8.2
	(20	9.5	1.50	6.3	9.7	1.28	7.5
Average		9.5	1.37	6.9	9.7	1.19	8.1

(1) Corrected to 17.5° C.

Summary

Two-and-one-half pounds of hydrated lime per 50 gallons of water sprayed on Conner orange trees at

suma orange trees at Spring Hill, Ala., caused no change in the fruit composition or maturity at picking time.

FLORIDA STUDY OF GRADES AND PACKS IS HIGHLY PRAISED

A recent study of grading, packing and stowing Florida produce, made by M. R. Ensign, truck horticulturist at the Florida Experiment Station, has elicited much favorable comment throughout the United States. Results of the study were published in Bulletin 254.

The March issue of Packing and Shipping, published in New York, contains the following note: "Intended to be of assistance to the fruit and vegetable grower of Florida, most of which have not had the opportunity to observe the handling of vegetable produce at the large markets of the country, the bulletin contains much helpful information based upon actual observations by Mr. Ensign of shipments all the way from point of origin to its destination."

At a meeting of the freight claim prevention committee, Atlantic States Shippers Advisory Board, in Philadelphia the last week in March, the bulletin received very favorable comment.

Others who have commented favorably on the bulletin are Lewis Pilcher

and Edward Dahill of the American Railway Association, M. C. Kennedy, former vice-president of the Pennsylvania Railroad, W. H. Henderson, general freight agent of the Atlantic Coast Line, and E. Y. Graves and W. H. Griffin of the Seaboard Air Line.

SPRAY FOR WHITEFLY ON UNDER SIDES OF LEAVES

Citrus growers who spray for whitefly control should be certain to spray the under sides of the citrus leaves, suggests Geo. B. Merrill, associate entomologist with the State Plant Board. The whiteflies live and work on the under sides of the leaves and spraying the upper surfaces will not kill them, he says.

His suggestion is prompted by the fact that often growers send in samples of material for examination, saying that it has been sprayed with an oil emulsion and should be free of whiteflies. When Mr. Merrill reports a finding of whiteflies, it is sometimes difficult for the grower to understand why the whiteflies have not been controlled. Mr. Merrill believes that in most cases it is due to failure to spray under the surfaces of the leaves.

**THE BULGE PACK AND POOR
CONTAINERS AS THEY AF-
FECT THE MARKETING
OF FLORIDA PRODUCE**
(Continued from page 6.)

parison. The 10-year average of car-load shipments of produce from Florida is, in round numbers, about 8,600. Assuming, then, only a 10 percent excess of produce in creating the bulge and assuming further that each car sold for only \$1,000 the loss amounts to \$860,000 per year.

The bulge pack is sometimes faked. This may take either of two forms or both. The produce is pyramided so as to give the appearance of an excessive amount while as a matter of fact, the net weight is no more than that contained in a flat pack and sometimes less. In containers such as the citrus boxes, the center cross panel is sometimes raised so that it, rather than the fruit, takes the pressure of the lid. Thus, the bulge pack generates falsification and deception.

2. The bulge pack is largely responsible for breakage of containers.

During the year 1930, 841,415 packages of fruit and vegetables arrived at Pier 28, New York City, in a broken condition. If these had been loaded into cars of 400 packages each, it would have required 2,103 cars. This represented 34.7 percent of all the cars received at that terminal. In 1929 the percentage of broken packages was 49.9 and in 1931 it was 36.5.

From 4:00 P. M., Sunday, February 13th to daylight on the 14th, the writer witnessed the unloading of 468 cars of produce at Pier 28, New York City. It required 315 men to do the job, although 48 of them, or approximately 15 percent of the total force were required to re-cooper broken packages.

The railroads of the United States in 1930 disbursed \$36,239,240 in loss and damage claims. Of this amount about 16%, or \$5,762,019, was for vegetables and nearly 3% (\$1,020,105) was for damage to fruits. Between 15 and 20 percent of these latter amounts was paid to growers, receivers and shippers of Florida produce. It is interesting to note in passing that only a minor portion of this million dollars apparently found its way into the hands of growers.

The facts related here reveal a condition of waste in the produce trade that few growers have realized. It is, therefore, pertinent to inquire how the bulge pack may be responsible for the breakage. These may be considered under three headings, as follows:—

(a) The use of poorly made and of ill-designed containers;

(b) Substituting less desirable methods of loading and stowing or disregarding the loading rules entirely or in part;

(c) The wilful breakage of packages at the wagon terminals is made possible and profitable because of the large breakage naturally occurring in transit.

(a) The use of poorly made and of ill-designed containers. Most containers now used by Florida growers were not designed to carry from 10 to 60 percent more produce than the minimum required by the United States Bureau of Standards. Also, the constant demand made by the growers for lighter and cheaper containers has contributed to certain weaknesses and consequently more breakage. In too many instances, knotty, cross-grained and very thin veneer has been made to sell cheaply. The poor design as to shape, size, and method of fastening has likewise contributed to breakage and damage. The two outstanding examples of such faulty containers are the round-bottomed basket and the conical hamper. The potato barrel is also objectionable because of lack of ventilation, excessive weight, and its odd shape. The following characteristics have been set up as a guide to the selection of desirable containers:—

1. Maximum strength with minimum weight.
2. Adequate ventilation.
3. Ease and rapidity of handling and safety of stowing.
4. Advantageous display of the produce without subjecting it to injury.
5. Adaptability to various kinds of fruits and vegetables so as to reduce the number of types to a minimum.
6. Fixtures for ease of opening for inspection.
7. The price should be reasonable.

(b) Substituting less desirable methods of loading and stowing or disregarding the loading rules entirely or in part. Much research work has been and is being done by carriers and other interested agencies in determining the most satisfactory methods of stowing and bracing loads so as to insure them against breakage. This has been a most difficult problem not only because of the differences in the dimensions of cars but chiefly because of the odd shapes and sizes of the multiple types of containers in use. Then, with the advent of the bulge pack, it was found that these standard practices would no longer apply, but that substitute methods of loading had to be devised. Packages with huge bellies could no longer be stowed lid side up but had

to be turned on their sides or stood on end. This not only made tight and stable loading difficult but in many instances, the weakest parts of the containers were called upon to take the greatest stress. Thus, the bulging tops are subjected to the sidewise rocking of the cars with the result that their contents are frequently scattered over the car floors. Other containers are constructed with the corners mortised so as to support great weight so long as the tops are up, but these readily give way when loaded on their sides and the load shifts.

There are specific rules for the loading and stowing of all types of containers admitted to the tariff for the railroads serving Florida. These rules are embodied in the so-called Dulany tariffs and are available to all growers and shippers. Many losses now sustained are directly attributable to loose loads, improperly stowed and braced, thus permitting the load to shift. This is a fault very common in citrus shipments from Florida. Citrus boxes are usually stood on end so loosely stowed that a rocking back and forth develops in the stopping and starting of the train. The bulging lids are an inch or more longer than the length of the boxes so that they project over the boxes unless the bulge is great enough to absorb the excessive length. Thus, the lid takes the weight of the box as well as that from the boxes on top of it, and the lids are often forced off by shearing through the nails.

(c) The wilful breakage of packages at the wagon terminals is made possible and profitable because of the large breakage naturally occurring in transit. Receivers and consignees in practically all terminals outside of New York unload the cars of produce directly to their own truck or wagon. Certain consignees have taken advantage of the natural breakage of containers incident to the bulge pack and have wilfully broken packages as they were unloaded, thus giving them additional reason for discounting the price to the grower or shipper and, at the same time, enlarging the size of the damage claim filed against the carrier. This practice became so common and succeeded so well at certain terminals that the railroads were compelled to put guards in the yard to supervise the unloading.

3. The bulge pack damages the produce.

Camp and Fifield at the Florida Agricultural Experiment Station have shown that a considerable percentage of grapefruit and oranges per box held in storage in the usual commercial bulge pack became unfit for con-

sumption. Fruits that were compressed and distorted in shape dried out or broke down. These were found chiefly in the corners of the box and at the ends where the lids were forced down for nailing.

The speaker took a single lot of tomatoes and packed them in lugs, half of them being put up in the regular bulge and half in a flat pack. These were held in storage at a temperature of 62 degrees, F. for five days to simulate the period of transit. The lugs were weighed at the beginning of the test, and all sound fruits were counted and weighed as they ripened. There was 17 percent more sound saleable fruit from the flat than from the bulge-packed lugs.

Every car of fresh tomatoes shipped in the United States in 1930 cost the growers \$40.04 in damage claims. Exact figures were not immediately available with regard to damage claims on Florida tomatoes but the indications are that the figure is larger than for the entire country.

Data are available that show about 2 percent greater loss of citrus packed in the standard box as compared to bulk (jumble pack in bags and boxes). While this amount seems trivial, yet on the basis of a 25,000,000 box crop selling for \$3.00 per box, the total loss runs into seven

THE CITRUS INDUSTRY

figures—\$1,500,000. The bulge pack seems to be responsible for this waste. The payment of approximately his amount in damage claims on Florida citrus in 1930 rather fully confirms such a supposition and a notation from the Pittsburg terminal by a competent, experienced observer indicts the bulge pack as follows:

"Pittsburgh Produce Terminal advise that 25 to 50 percent of the loss and damage to shipments of oranges and grapefruit from Florida is due to bulge pack and excessive bulge pack. There is practically no loss and damage to this commodity from California due to this cause, a flatter pack being used.

"The shipments from California are well stowed, while shipments from Florida are poorly stowed; most of damage from California due to cut sides and easily repaired."

Discussion

Sufficient data have been secured to show that the bulge pack and its close relatives, the great array of poorly designed and poorly made containers, are responsible for enormous economic losses to the horticultural industry of Florida. Some of the most important items involved may be summarized as follows:

1. Value of commodities given in excess of full measure equals 10 per-

Twenty-five

cent of 8,600 cars at \$1,000

2. Loss and damage claims	\$ 860,000
paid	1,066,000
3. Reoperation charges, \$3.00	
per car	25,000
4. Reduction in cost of containers if standard package adopted	50,000
5. Losses now sustained through discounted price paid because of bad appearance and damage	10,000,000

Total Loss \$13,001,000

In addition to the above items, it seems desirable to call attention to the freight rates that seem exceedingly burdensome to Florida growers. At the present time, \$15.00 in freight charges must be collected on every car of produce in order to satisfy actual damage claims. This does not take account of the numerous clerks, attorneys, and other costs incidental to the handling of these claims for which the growers pay. Furthermore, these claim figures represent averages for the United States and there is reason to believe that the claims on Florida produce are higher than the average. It would seem that Florida growers would have an entirely valid argument in asking for a reduction in

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freight rates averaging at least \$10 per car if they first eliminated the bulge pack and its attendant evils. This would be a net saving of \$860,000 annually as a minimum.

Just, how, when, and by whom this costly bulge pack practice may be stopped, it is quite difficult to say. There can be no question, however, upon whose shoulders the responsibility rests or whose pockets are most depleted. The growers furnish the excess produce that bursts the packages that must be re-coopered, that are discounted or rejected by the buyers, and the growers also pay the high freight tariffs that go to defray the damage claims. It is just as certain that the growers can stop the practice through concerted action. If no bulged packages were shipped out of Florida, the buyers would pay for a bushel of produce—no more, no less—just as sugar, salt, and automobiles are bought and sold without a bulge pack. This fact has been demonstrated in a number of instances, notably the Georgia peach deal. Until three years ago Georgia peach growers attempted to put five pecks in the round bottomed bushel basket and the havoc wrought was exactly what might be expected. Three years ago they discarded the round-bottomed baskets in favor of tub baskets with the built up bottom, a much more stable container, and then each basket was ring packed. Only four pecks could be put into each container and still preserve the pack. Incidentally the emphasis was put upon quality instead of quantity with the result that Georgia peaches have brought more money per package with infinitely less waste and 25% more packages. Will Florida growers follow this example?

The railroad officials could refuse to accept for transportation any bulge packed produce for they are in full possession of the facts regarding the losses arising therefrom. The reasons why such steps have not been taken are obvious.

A third source of help in regulating the bulge pack to the scrap heap lies in the action of the Interstate Commerce Commission. If that body could be prevailed upon to rule against this stupid but expensive practice on the grounds that it entails unnecessary waste, it would seem most desirable. After all, it seems as if growers like to be told what they must do.

In conclusion, it should be said that every grower in Florida would be greatly benefitted by visiting some of the large terminal markets of the country. If he were a true Floridian interested in the growth and pros-

perity of this great state, he could not help expressing his surprise, indignation, and disgust at the condition on arrival of Florida produce on account of the unsound practices already reviewed. The writer felt a sense of wounded pride in his adopted state as he saw cabbage in misshapen, bulging, headless hampers; peppers and cucumbers strewn all over the car floor; citrus boxes twisted and broken with fruit crushed and cut. Even the stevedores spoke depreciatingly of Florida produce.

It has been said that comparisons are odious, and yet this phrase seemed to be peculiarly applicable from the standpoint of a Floridian, as one compared produce from various competing areas with that from Florida. He could readily see which lots would sell first and command the higher

price. While it is true that the bulge pack is in more or less general use in the markets of the country, yet there are certain differences that should be noted. Many of the containers used by growers outside of Florida may be bulged and yet not present a displeasing appearance. Then, certain products such as California celery are not bulged, it being put into a container that will not admit of a bulge. It is sold at a premium on the basis of quality and fine appearance instead of quantity. The same may be said of citrus from California and other competing areas. In a few instances, Florida growers who have established a reputation for an honest pack of high quality produce do not have to stoop to wasteful and questionable methods to dispose of their product at a profit.

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